

EXHIBIT A-2
IDENTIFICATION OF PRIOR ART THAT ANTICIPATES AND/OR RENDERS OBVIOUS THE ASSERTED '661
CLAIMS
PATENT L.R. 3-3(B)

ASSERTED CLAIM	IDENTITY OF PRIOR ART THAT ANTICIPATES AND/OR RENDERS OBVIOUS THE ASSERTED CLAIM
<p>1. A cryptographic processing device for securely performing a cryptographic processing operation including a sequence of instructions in a manner resistant to discovery of a secret by external monitoring, comprising:</p> <p>(a) an input interface for receiving a quantity to be cryptographically processed, said quantity being representative of at least a portion of a message;</p> <p>(b) a source of unpredictable information;</p> <p>(c) a processor;</p> <p>(i) connected to said input interface for receiving and cryptographically processing said quantity,</p> <p>(ii) configured to use said unpredictable information to conceal a correlation between externally monitorable signals and said secret during said processing of said quantity by modifying said sequence; and</p> <p>(d) an output interface for outputting said cryptographically processed quantity to a</p>	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Griffin '294 Sci.crypt Postings Dunlavy '201</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p> <p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. §103 by the above listed references, individually or in combination with one or more of the following references:</p> <p>Ugon '833 Griffin '294 Sci.crypt Postings Dunlavy '201 Hoppe '894 Wakerly (1989) Rankl (1997) Schaumüller-Bichl (1987) ISO 7816</p>

recipient thereof.

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag. Pro. Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.

Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the event that Ugon '833 does not fully anticipate the claim, it nevertheless renders the claim invalid as obvious. For example, Ugon '833 teaches all elements of the claim and provides motivation to combine them, e.g., at 3:59-4:8 (the disclosed improvements are designed for use in ST16XY cards); 1:14-19 (the disclosed improvements are intended to be implemented in microprocessors and microcomputers which require protection). In the alternative, Ugon '833, in combination with one or more of the above listed references, renders the claim invalid as obvious.

Similarly, each of Griffin '294, the Sci.Crypt Postings, and Dunlavy '201 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.

2. The device of claim 1 wherein said input

ANTICIPATION

interface and said output interface are the same element.	The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following reference: Dunlavy '201
	<p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following reference:</p> <p>Ugon '833</p> <p>OBVIOUSNESS</p> <p>The claim is rendered obvious by any of the references or combinations of references showing obviousness of claim 1.</p> <p>Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.</p> <p>SUGGESTION OR MOTIVATION TO COMBINE</p> <p>Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See <u>Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p> <p>For example, ISO 7816 shows standard pin assignments, which include an I/O</p>

<p>4. The device of claim 1 wherein said cryptographic processing operation includes transforming a message with the Data Encryption Standard (DES).</p>	<p>interface.</p> <p>Each of Ugon '833 and Dunlavy '201 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, either of these references renders the claim obvious, alone or in combination with any of the above listed references.</p> <p>OBVIOUSNESS</p> <p>The claim is rendered obvious under 35 U.S.C. §103 by one or more of the following references:</p> <p>Ugon '833 Sci.crypt Postings Griffin '294 Dunlavy '201</p>	<p>individually or in combination with one or more of the following references:</p> <p>Ugon '833 Sci.crypt Postings Griffin '294 Dunlavy '201 Menezes (1997) FIPS PUB 46-2 (1993) Wakerly (1989) Rankl (1997) Hoppe '894 ISO 7816 Schaumüller-Bichl (1987)</p> <p>Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.</p> <p>SUGGESTION OR MOTIVATION TO COMBINE</p> <p>Initially, no suggestion or motivation to combine one or more of the references listed</p>
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<p>above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. <u>See Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p> <p>For example, FIPS PUB 46-2 (1993) describes the DES standard and suggests its use in certain microprocessors. Additionally, Menezes (1997) at 250 discusses DES as a well-known cryptographic algorithm.</p>	<p>ANTICIPATION</p>	<p>The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Sci.crypt Postings Lindholm '725 Van Eck '117</p> <p>OBVIOUSNESS</p> <p>The claim is rendered obvious under 35 U.S.C. §103 by one or more of the following references:</p> <p>Sci.crypt Postings Ugon '833 Lindholm '725 Van Eck '117</p>
<p>5. A cryptographic processing device for securely performing a cryptographic processing operation implementing a permutation in a manner resistant to discovery of a secret by external monitoring, comprising:</p> <p>(a) an input interface for receiving a quantity to be cryptographically processed, said quantity being representative of at least a portion of a message;</p> <p>(b) a source of unpredictable information;</p> <p>(c) a processor:</p> <p>(i) connected to said input interface for receiving and cryptographically processing</p>		

said quantity,	Dunlavy '201	<p>(ii) configured to use said unpredictable information to conceal a correlation between externally monitorable signals and said secret during said processing of said quantity by randomizing the order of said permutation; and</p> <p>(d) an output interface for outputting said cryptographically processed quantity to a recipient thereof.</p>	<p>individually or in combination with one or more of the following references:</p> <p>Sci crypt Postings Ugon '833 Lindholm '725 Van Eck '117 Dunlavy '201 Hoppe '894 Wakerly (1989) Rankl (1997) Schaumüller-Bichl (1987) ISO 7816 FIPS Pub 46-2 (1993) Menezes (1997)</p>
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Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed

<p>components had been or could be used with cryptographic processing devices.</p> <p>For example, Menezes (1997) at 10 teaches that permutations are commonly used in cryptographic operations.</p> <p>Each of Lindholm '725, the Sci.crypt Postings, and Van Eck '117 fully anticipates the claim by disclosing all claim elements either explicitly or implicitly or under the doctrine of inherency. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p>	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Fruhauf '053 Griffin '294 Sci.crypt Postings Lisimaque '039 Saltwick '243 Malek '467</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p> <p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. §103 by one or more of the following references:</p> <p>Ugon '833 Fruhauf '053 Griffin '294 Sci.crypt Postings Lisimaque '039 Saltwick '243</p>
<p>6. A cryptographic processing device implemented on a single microchip for securely performing a cryptographic processing operation in a manner resistant to discovery of a secret by external monitoring, comprising:</p> <p>(a) an input interface for receiving a quantity to be cryptographically processed, said quantity being representative of at least a portion of a message;</p> <p>(b) a source of unpredictable information;</p> <p>(c) a processor;</p> <p>(i) connected to said input interface for receiving and cryptographically processing said quantity,</p> <p>(ii) configured to use said unpredictable information to conceal a correlation between said microchip's power consumption and said processing of said quantity by expending additional electricity in said microchip during said processing; and</p> <p>(d) an output interface for outputting said</p>	

cryptographically processed quantity to a
recipient thereof.

Malek '467
Van Eck '117
Høivik '098
Dunlavy '201
Lindholm '725
Lindholm '713

individually or in combination with one or more of the following references:

Ugon '833
Fruhauf '053
Griffin '294
Sci.crypt Postings
Lisimaque '039
Saltwick '243
Malek '467
Van Eck '117
Høivik '098
Dunlavy '201
Lindholm '725
Lindholm '713
Guthery (1998)
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Guillou (1986)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the
references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed

above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.

For example, one of ordinary skill in the art would be motivated to combine Rank '1997 (describing subscriber networks as a potential implementation of smartcards) with Griffin '294. Further, Guthery teaches that smartcards are frequently designed having single-chip processors. Dunlavy '201 suggests (e.g., at 8:13-19) its implementation on any type of computer, computer peripheral or other type of electronic device.

Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the event that Ugon '833 does not fully anticipate the claim, it nevertheless renders the claim invalid as obvious. For example, Ugon '833 teaches all elements of the claim and provides motivation to combine them, e.g., at 3:59-4:8 (the disclosed improvements are designed for use in ST16XY cards); 1:14-19 (the disclosed improvements are intended to be implemented in microprocessors and microcomputers which require protection). In the alternative, Ugon '833, in combination with one or more of the above listed references, renders the claim invalid as obvious.

Similarly, each of Fruhauf '053, Griffin '294, the Sci.crypt Postings, Lisimaque '039, Saltwick '243, and Malek '467 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of

7. The device of claim 6 including program logic to activate said expending during said processing.	<p>these references renders the claim obvious, alone or in combination with any of the above listed references.</p> <p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Van Eck '117 Griffin '294 Sci.crypt Postings Lisimaque '039 Malek '467</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p>	<p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. §103 by one or more of the following references:</p> <p>Ugon '833 Dunlavy '201 Van Eck '117 Sci.crypt Postings Griffin '294 Lisimaque '039 Malek '467</p> <p>alone or in combination with one or more of the following references:</p> <p>Ugon '833 Dunlavy '201 Van Eck '117 Sci.crypt Postings</p>
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Griffin '294
Lisimaque '039
Malek '467
Guthery (1998)
ISO 7816
Hoppe '894
Wakerly (1989)
Rankl (1997)
Guillou (1986)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.

Each of Ugon '833, Van Eck '117, Griffin '294, the Sci.crypt Postings, Lisimaque '039, and Malek '467 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above

8. The device of claim 7 including	<p>(a) program logic implementing said source of unpredictable information; and</p> <p>(b) program logic to transmit said unpredictable information to an additional power expending circuit contained in said microchip.</p>	listed references.	ANTICIPATION	The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:
			Lisimaque '039 Malek '467	The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:

Ugon '833

OBVIOUSNESS

The claim is rendered obvious under 35 U.S.C. §103 by one or more of the following references:

Ugon '833
Dunlavy '201
Lisimaque '039
Malek '467

individually or in combination with one or more of the following references:

Ugon '833
Dunlavy '201
Lisimaque '039
Malek '467
Guthery (1998)
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Guillou (1986)

Schaumüller-Bichl (1987)	<p>Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.</p> <p>SUGGESTION OR MOTIVATION TO COMBINE</p> <p>Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See <u>Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p>	<p>Each of Ugon '833, Lisimaque '039, and Malek '467 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p> <p>ANTICIPATION</p> <p>The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Fruhauf '053 Lindholm '713 Malek '467 Dunklavy '201 Griffin '294</p>
	<p>9. A cryptographic processing device for securely performing a cryptographic processing operation in a manner resistant to discovery of a secret by external monitoring, comprising:</p> <p>(a) an input interface for receiving a quantity to be cryptographically processed, said quantity being representative of at least a</p>	

portion of a message;	The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:
(b) a source of unpredictable information;	Ugon '833
(c) a processor;	Wuidart '917
(i) connected to said input interface for receiving and cryptographically processing said quantity,	OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. § 103 by the following references:
(ii) configured to use said unpredictable information to conceal a correlation between externally monitorable signals and said secret during said processing of said quantity;	Ugon '833 Wuidart '917 Fruhauf '053 Lindholm '713 Malek '467 Dunlavy '201 Griffin '294
(d) an output interface for outputting said cryptographically processed quantity to a recipient thereof;	individually or in combination with one or more of the following references:
(e) a hardware-implemented noise production subunit connected to said source of unpredictable information and configured to expend unpredictable amounts of electricity based on the output of said source of unpredictable information; and	Ugon '833 Wuidart '917 Fruhauf '053 Lindholm '713 Malek '467 Dunlavy '201 Griffin '294 Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997) Schaumüller-Bichl (1987)
(f) an activation controller, which may be activated by software contained in said device, to activate and deactivate said expending of unpredictable amounts of electricity.	Further, Visa reserves the right to demonstrate invalidity using one or more of the

references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.

Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the event that Ugon '833 does not fully anticipate the claim, it nevertheless renders the claim invalid as obvious. For example, Ugon '833 teaches all elements of the claim and provides motivation to combine them, e.g., at 3:59-4:8 (the disclosed improvements are designed for use in ST16XY cards); 1:14-19 (the disclosed improvements are intended to be implemented in microprocessors and microcomputers which require protection). In the alternative, Ugon '833, in combination with one or more of the above listed references, renders the claim invalid as obvious.

Similarly, each of Fruhauf '053, Lindholm '713, Malek '467, Dunlavy '201, Griffin '294 and Wuidart '917 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.

OBVIOUSNESS

10. The device of claim 9 wherein said

source of unpredictable information is a hardware-implemented random number generator, and wherein said noise production subunit includes a digital-to-analog converter.

The claim is rendered obvious under 35 U.S.C. §103 by the following references:

Ugon '833	Wuidart '917
Wuidart '917	Lindholm '713
Lindholm '713	Malek '467
Malek '467	Dunlavy '201
Dunlavy '201	Griffin '294

individually or in combination with one or more of the following references:

Ugon '833	Wuidart '917
Wuidart '917	Lindholm '713
Lindholm '713	Malek '467
Malek '467	Dunlavy '201
Dunlavy '201	Griffin '294
Griffin '294	JP10197610
JP10197610	JP10084223
JP10084223	JP62082702
JP62082702	JP62260406
JP62260406	Hoppe '894
Hoppe '894	ISO 7816
ISO 7816	Wakerly (1989)
Wakerly (1989)	Rankl (1997)
Rankl (1997)	Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective

<p>functions nor does the combination provide a new or different function. See <u>Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p>	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Griffin '294 Sci.crypt Postings Fruhauf '053 Sprunk '402 Lisimae '039 Kolbert '057 Lindholm '725 Meyr '962 Nossen '423 Lindholm '713 Saltwick '243 Malek '467 Van Eck '117 Dunlavy '201 Høivik '098</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p>
<p>11. A cryptographic processing device for securely performing a cryptographic processing operation in a manner resistant to discovery of a secret by external measurement of said device's power consumption, comprising:</p> <p>(a) an input interface for receiving a quantity to be cryptographically processed, said quantity being representative of at least a portion of a message;</p> <p>(b) an input interface for receiving a variable amount of power, said power consumption varying measurably during said performance of said operation;</p> <p>(c) a processor connected to said input interface for receiving and cryptographically processing said quantity; and</p> <p>(d) a noise production system for introducing noise into said measurement of said power consumption.</p>	<p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p>

Wuidart '917

OBVIOUSNESS

The claim is rendered obvious under 35 U.S.C. §103 by the following references:

Ugon '833

Wuidart '917

Griffin '294

Sci.crypt Postings

Fruhauf '053

Sprunk '402

Lisimaque '039

Kolbert '057

Lindholm '725

Meyr '962

Nossen '423

Lindholm '713

Saltwick '243

Malek '467

Van Eck '117

Dunlavay '201

Høivik '098

individually or in combination with one or more of the following references:

Ugon '833

Wuidart '917

Griffin '294

Sci.crypt Postings

Fruhauf '053

Sprunk '402

Lisimaque '039

Kolbert '057

Lindholm '725

Meyr '962
Nossen '423
Lindholm '713
Saltwick '243
Malek '467
Van Eck '117
Dunlavy '201
Høivik '098
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.

Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either

	<p>explicitly, implicitly, or inherently. In the event that Ugon '833 does not fully anticipate the claim, it nevertheless renders the claim invalid as obvious. For example, Ugon '833 teaches all elements of the claim and provides motivation to combine them, e.g., at 3:59-4:8 (the disclosed improvements are designed for use in ST16XY cards); 1:14-19 (the disclosed improvements are intended to be implemented in microprocessors and microcomputers which require protection). In the alternative, Ugon '833, in combination with one or more of the above listed references, renders the claim invalid as obvious.</p> <p>Similarly, each of Griffin '294, the Sci.crypt Postings, Fruhauf '053, Sprunk '402, Lisimaque '039, Kolbert '057, Lindholm '725, Meyer '962, Nossen '423, Lindholm '713, Saltwick '243, Malek '467, Van Eck '117, Dunlavay '201, Høivik '098, and Wuidart '917 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p>
<p>12. The device of claim 11 wherein said noise production system comprises:</p> <ol style="list-style-type: none"> a source of randomness for generating initial noise having a random characteristic; a noise processing module for improving the random characteristic of said initial noise; and a noise production module configured to vary said power consumption based on an output of said noise processing module. 	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>(a) Griffin '294 Fruhauf '053 Lindholm '725 Lindholm '713 Saltwick '243 Malek '467 Høivik '098</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833 Wuidart '917</p> <p>OBVIOUSNESS</p>

The claim is rendered obvious under 35 U.S.C. §103 by the following references:

Ugon '833
Wuidart '917
Griffin '294
Fruhauf '053
Lindholm '725
Lindholm '713
Saltwick '243
Malek '467
Høivik '098

individually or in combination with one or more of the following references:

Ugon '833
Wuidart '917
Griffin '294
Fruhauf '053
Lindholm '725
Lindholm '713
Saltwick '243
Malek '467
Høivik '098
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed

<p>above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. <u>See Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p> <p>Each of Ugon '833, Griffin '294, Fruhauf '053, Lindholm '713, Saltwick '243, Malek '467, Høivik '098, and Wuidart '917 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p>	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Griffin '294 Lindholm '713 Malek '467</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833 Wuidart '917</p> <p>OBVIOUSNESS</p>
<p>13. The device of claim 12 wherein said noise production system is connected to said processor and is selectively operable under the control of said processor.</p>	

The claim is rendered obvious under 35 U.S.C. §103 by the following references:

Ugon '833
Wuidart '917
Griffin '294
Fruhauf '053
Lindholm '713
Malek '467

individually or in combination with one or more of the following references:

Ugon '833
Wuidart '917
Griffin '294
Fruhauf '053
Lindholm '713
Malek '467
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag. Pro. Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the

<p>references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p> <p>Each of Ugon '833, Griffin '294, Lindholm '713, Malek '467, and Wuidart '917 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p>	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p> <p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. §103 by the following references:</p> <p>Ugon '833 Wuidart '917</p> <p>individually or in combination with one or more of the following references:</p> <p>Ugon '833 Wuidart '917 Sprunk '402 Sci.crypt Postings Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997)</p>
<p>14. A cryptographic processing device for securely performing a cryptographic processing operation in a manner resistant to discovery of a secret by external monitoring comprising:</p> <p>(a) an input/output interface for receiving data to be cryptographically processed, said data being representative of at least a portion of a message;</p> <p>(b) an oscillator generating a first clock signal;</p> <p>(c) an input interface for receiving a variable amount of power, said power consumption varying measurably during said performance of said operation;</p> <p>(d) a source of unpredictable information;</p> <p>(e) a clock decorrelator coupled to said source of unpredictable information for</p>	

<p>generating a second clock signal from said first clock signal using said unpredictable information, such that said second clock signal cannot be reliably predicted from said first clock signal; and</p> <p>(f) a processor:</p> <p>(i) clocked by said second clock signal,</p> <p>(ii) configured to cryptographically process said data, and</p> <p>(iii) configured to output said cryptographically processed data using said input/output interface.</p>	<p>Schaumüller-Bichl (1987)</p> <p>Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.</p>	<p>SUGGESTION OR MOTIVATION TO COMBINE</p> <p>Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See <u>Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p> <p>Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the event that Ugon '833 does not fully anticipate the claim, it nevertheless renders the claim invalid as obvious. For example, Ugon '833 teaches all elements of the claim and provides motivation to combine them, e.g., at 3:59-4:8 (the disclosed improvements are designed for use in ST16XY cards); 1:14-19 (the disclosed improvements are intended to be implemented in microprocessors and microcomputers which require protection). In the alternative, Ugon '833, in combination with one or more of the above listed references, renders the claim invalid as obvious.</p>
<p>15. A cryptographic processing device for securely performing a cryptographic processing operation in a manner resistant to discovery of a secret by external monitoring</p>	<p>ANTICIPATION</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p>	

of said device's power consumption, comprising:	Ugon '833	OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. § 103 by the following references:
(a) an input/output interface for receiving data to be cryptographically processed, said data being representative of at least a portion of a message;	Ugon '833 Wuidart '917	individually or in combination with one or more of the following references:
(b) an input interface for receiving an external clock signal;	Ugon '833 Wuidart '917	Sprunk '402 Sci.crypt Postings
(c) an input interface for receiving a variable amount of power, said power consumption varying measurably during said performance of said operation;	Ugon '833 Wuidart '917	Hoppe '894 ISO 7816
(d) a source of unpredictable information; (e) a clock decorrelator coupled to said source of unpredictable information for generating an internal clock signal from said external clock signal using said unpredictable information, such that said internal clock signal cannot be reliably predicted from said external clock signal; and	Wakerly (1989) Rankl (1997)	Schaumüller-Bichl (1987)
		Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.
		SUGGESTION OR MOTIVATION TO COMBINE
(f) a processor:	(i) clocked by said internal clock signal, (ii) configured to cryptographically process said data, and (iii) configured to output said cryptographically processed data using said input/output interface.	Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. <u>See Sakraida v. Ag Pro, Inc.</u> , 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u> , 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that

<p>each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p> <p>Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the event that Ugon '833 does not fully anticipate the claim, it nevertheless renders the claim invalid as obvious. For example, Ugon '833 teaches all elements of the claim and provides motivation to combine them, e.g., at 3:59-4:8 (the disclosed improvements are designed for use in ST16XY cards); 1:14-19 (the disclosed improvements are intended to be implemented in microprocessors and microcomputers which require protection). In the alternative, Ugon '833, in combination with one or more of the above listed references, renders the claim invalid as obvious.</p>	<p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. §103 by the following references:</p> <p>Ugon '833 Wuidart '917</p> <p>individually or in combination with one or more of the following references:</p> <p>Ugon '833 Wuidart '917 Sprunk '402 Sci.crypt Postings Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997) Schaumüller-Bischl (1987)</p>
<p>16. The device of claim 15 wherein said clock decorrelator comprises a clock skipping module which selects a subset of the cycles of said external clock signal to use as said internal clock signal based on said unpredictable information.</p>	<p>Further, Visa reserves the right to demonstrate invalidity using one or more of the</p>

references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.

The motivation to use an external signal to generate an internal signal may be found, for example, in Sprunk '402 at, e.g., 1:52-54 (random signal to generate clock eliminates the ability to predict the clock even if observable) and/or Sci.crypt Postings at, e.g. posting by Jim Bell, December 24, 1995 (using pseudorandomly varied oscillator would make resulting computer harder to bug). Further, Rankl (1997) at 44 and 264 teaches that smart card processors require an external clock signal.

ANTICIPATION

The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:

Ugon '833

OBVIOUSNESS

The claim is rendered obvious under 35 U.S.C. §103 by the following references:

Ugon '833

Vuidart '917	<p>individually or in combination with one or more of the following references:</p> <p>Ugon '833 Wuidart '917 Sprunk '402 Sci.crypt Postings Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997) Schäumüller-Bichl (1987)</p> <p>Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.</p> <p>SUGGESTION OR MOTIVATION TO COMBINE</p> <p>Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. <u>See Sakraida v. Ag. Pro. Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p> <p>Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either</p>
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<p>18. The device of claim 15 further comprising a monitor for detecting a clock fault in said external clock signal and preventing said processor from processing said quantity if said clock fault is detected.</p>	<p>explicitly, implicitly, or inherently. In the alternative, Ugon '833, alone or in combination with one or more of the above listed references, renders the claim invalid as obvious.</p> <p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. §103 by the following references:</p> <p>Ugon '833 Wuidart '917</p> <p>individually or in combination with one or more of the following references:</p> <p>Ugon '833 Wuidart '917 Sprunk '402 Sci.crypt Postings Griffin '294 Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997) Schaumüller-Bichl (1987)</p>	<p>Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.</p> <p>SUGGESTION OR MOTIVATION TO COMBINE Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See <u>Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a</p>
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<p>person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p> <p>The motivation to a fault monitor as claimed is found, for example, in Griffin '294 at 2:30-36 and generally at 3:37-5:26.</p> <p>ANTICIPATION</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p>	<p>OBVIOUSNESS</p> <p>The claim is rendered obvious under 35 U.S.C. §103 by the following references:</p> <p>Ugon '833 Wuidart '917</p> <p>individually or in combination with one or more of the following references:</p> <p>Ugon '833 Wuidart '917 Sprunk '402 Sci.crypt Postings Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997) Schaumüller-Bichl (1987)</p> <p>Further, Visa reserves the right to demonstrate invalidity using one or more of the</p>
19. The device of claim 15 wherein said clock decorrelator is selectively operable under the control of said processor.	

<p>references listed in Exhibit A-1, and any other art it may later identify.</p>	<p>SUGGESTION OR MOTIVATION TO COMBINE</p> <p>Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See <u>Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p>	<p>Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, Ugon '833, alone or in combination with one or more of the above listed references, renders the claim invalid as obvious.</p>	<p>ANTICIPATION</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p>	<p>OBVIOUSNESS</p> <p>The claim is rendered obvious under 35 U.S.C. §103 by the following references:</p> <p>Ugon '833 Wuidart '917</p>
	<p>20. The device of claim 15 wherein said clock decorrelator is selectively operable such that said clock decorrelator is disabled when data is being transferred across said input/output interface and enabled during said cryptographic processing operation.</p>			

individually or in combination with one or more of the following references:

Ugon '833
Wuidart '917
Sprunk '402
Sci.crypt Postings
Lindholm '725
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag. Pro. Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.

Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, Ugon '833, alone or in

21. The device of claim 15 further comprising a noise production system connected to said processor for introducing noise into said measurement of the power consumption by consuming a random amount of power during said cryptographic processing operation.	<p>combination with one or more of the above listed references, renders the claim invalid as obvious.</p> <p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p> <p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. §103 by the following references:</p> <p>Ugon '833 Wuidart '917</p> <p>individually or in combination with one or more of the following references:</p> <p>Ugon '833 Wuidart '917 Sprunk '402 Sci.crypt Postings Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997) Schaumüller-Bichl (1987)</p>
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Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective

<p>functions nor does the combination provide a new or different function. See <u>Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p> <p>Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, Ugon '833, alone or in combination with one or more of the above listed references, renders the claim invalid as obvious.</p>	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Griffin '294 Sci.crypt Postings Dunlavy '201</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p> <p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. § 103 by the above listed references, individually or in combination with one or more of the following references:</p> <p>Ugon '833 Griffin '294</p>
<p>22. A device according to claims 1, 4, 7, 9, 11, 14, 15, or 20 wherein said device comprises a smartcard.</p>	

Sci.crypt Postings
Dunlavy '201
Hoppe '894
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)
ISO 7816

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.

Each of Ugon '833, Griffin '294, the Sci.crypt Postings, and Dunlavy '201 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.

ANTICIPATION
The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following
23. A method of securely performing a cryptographic processing operation in a manner resistant to discovery of a secret

<p>within a cryptographic processing device by external monitoring, comprising:</p> <p>(a) receiving a quantity to be cryptographically processed, said quantity being representative of at least a portion of a message;</p>	<p>(b) generating unpredictable information;</p> <p>(c) cryptographically processing said quantity, including using said unpredictable information while processing said quantity to conceal a correlation between externally monitorable signals and said secret by selecting between:</p> <p>(c)(1) performing a computation and incorporating the result of said computation in said cryptographic processing, and</p> <p>(c)(2) performing a computation whose output is not incorporated in said cryptographic processing; and</p> <p>(d) outputting said cryptographically processed quantity to a recipient thereof.</p>	<p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following reference:</p> <p>Ugon '833</p>	<p>OBVIOUSNESS The claim is rendered obvious by any of the references or combinations of references showing obviousness of claim 1.</p> <p>Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.</p> <p>SUGGESTION OR MOTIVATION TO COMBINE Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See <u>Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed components had been or could be used with cryptographic processing devices; and/or (6) a suggestion in the reference that the disclosed components had been or could be used with cryptographic processing devices.</p>	<p>For example, ISO 7816 shows standard pin assignments, which include</p>
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<p>24. The method of claim 23 where said selecting is performed in software.</p>	<p>an I/O interface.</p> <p>Each of Ugon '833 and Dunlavy '201 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, either of these references renders the claim obvious, alone or in combination with any of the above listed references.</p> <p>ANTICIPATION</p> <p>The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Griffin '294 Sci.crypt Postings Malek '467 Van Eck '117</p>	<p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p> <p>OBVIOUSNESS</p> <p>The claim is rendered obvious under 35 U.S.C. §103 by the following references:</p> <p>Ugon '833 Griffin '294 Sci.crypt Postings Malek '467 Van Eck '117</p> <p>individually or in combination with one or more of the following references:</p> <p>Ugon '833 Griffin '294 Sci.crypt Postings Malek '467</p>
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	<p>Van Eck '117 Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997) Schaumüller-Bichl (1987)</p> <p>Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.</p>	<p>SUGGESTION OR MOTIVATION TO COMBINE</p> <p>Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See <u>Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.</p> <p>Each of Ugon '833, Griffin '294, the Sci.crypt Postings, Malek '467 and Van Eck '117 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p> <p>ANTICIPATION</p> <p>The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>25. The method of claim 23 where said selecting is performed in hardware on an integrated circuit including a</p>
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microprocessor.

Griffin '294
Sci.crypt Postings
Malek '467
Van Eck '117

The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:
Ugon '833

OBVIOUSNESS

The claim is rendered obvious under 35 U.S.C. §103 by the following references:
Ugon '833

Griffin '294
Sci.crypt Postings
Malek '467
Van Eck '117

individually or in combination with one or more of the following references:
Ugon '833

Griffin '294
Sci.crypt Postings
Malek '467
Van Eck '117
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

<p>SUGGESTION OR MOTIVATION TO COMBINE</p> <p>Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. <u>See Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.</p>	<p>Each of Ugon '833, Griffin '294, the Sci.crypt Postings, Malek '467 and Van Eck '117 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p> <p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Griffin '294 Van Eck '117 Hovivik '098</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following reference:</p> <p>Ugon '833</p> <p>OBVIOUSNESS</p>
<p>26. A method of securely performing a cryptographic processing operation in a manner resistant to discovery of a secret within a cryptographic processing device by external monitoring, comprising:</p> <p>(a) receiving a quantity to be cryptographically processed, said quantity being representative of at least a portion of a message;</p> <p>(b) generating unpredictable information;</p> <p>(c) cryptographically processing said quantity, including using said unpredictable</p>	<p>Ugon '833</p>

information while processing said quantity to conceal a correlation between externally monitorable signals and said secret by selecting a code process from a plurality of code processes, where said selected code process is involved in said cryptographic processing, but where the value of said outputted quantity is independent of which of said code processes was selected; and (d) outputting said cryptographically processed quantity to a recipient thereof.

The claim is rendered obvious under 35 U.S.C. § 103 by the following references:

Ugon '833
Griffin '294
Van Eck '117
Hoivik '098

individually or in combination with one or more of the following references:

Ugon '833
Griffin '294
Van Eck '117
Hoivik '098
Sci.crypt.Postings
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that

	<p>each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.</p> <p>Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the event that Ugon '833 does not fully anticipate the claim, it nevertheless renders the claim invalid as obvious. For example, Ugon '833 teaches all elements of the claim and provides motivation to combine them, e.g., at 3:59-4:8 (the disclosed improvements are designed for use in ST16XY cards); 1:14-19 (the disclosed improvements are intended to be implemented in microprocessors and microcomputers which require protection). In the alternative, Ugon '833, in combination with one or more of the above listed references, renders the claim invalid as obvious.</p> <p>Similarly, each of Griffin '294, Van Eck '117, and Hoivik '098 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p>	<p>ANTICIPATION</p> <p>The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Griffin '294 Dunlavy '201 Lindholm '713 Sci.Crypt Postings</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following reference:</p> <p>Ugon '833</p> <p>OBVIOUSNESS</p>
	<p>27. A method of securely performing a cryptographic processing operation including a sequence of instructions in a manner resistant to discovery of a secret within a cryptographic processing device by external monitoring, comprising:</p> <p>(a) receiving a quantity to be cryptographically processed, said quantity being representative of at least a portion of a message;</p> <p>(b) generating unpredictable information;</p> <p>(c) using said unpredictable information while processing said quantity to conceal a</p>	

correlation between externally monitorable signals and said secret by using said unpredictable information to modify said sequence; and

(d) outputting said cryptographically processed quantity to a recipient thereof.

The claim is rendered obvious under 35 U.S.C. §103 by the following references:

Griffin '294
Dunlavy '201
Lindholm '713
Sci.crypt Postings
Ugon '833

individually or in combination with one or more of the following references:

Griffin '294
Dunlavy '201
Lindholm '713
Sci.crypt Postings
Ugon '833
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person

<p>of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.</p> <p>Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the event that Ugon '833 does not fully anticipate the claim, it nevertheless renders the claim invalid as obvious. For example, Ugon '833 teaches all elements of the claim and provides motivation to combine them, <i>e.g.</i>, at 3:59-4:8 (the disclosed improvements are designed for use in ST16XY cards); 1:14-19 (the disclosed improvements are intended to be implemented in microprocessors and microcomputers which require protection). In the alternative, Ugon '833, in combination with one or more of the above listed references, renders the claim invalid as obvious.</p> <p>Similarly, each of Griffin '294, Lindholm '713, Dunlavy '201, and the Sci.crypt Postings fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p>	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Sci.crypt Postings Lindholm '725 Van Eck '117</p> <p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. § 103 by one or more of the following references:</p> <p>Sci.crypt Postings</p>
<p>28. A method of securely performing a cryptographic processing operation implementing a permutation in a manner resistant to discovery of a secret within a cryptographic processing device by external monitoring, comprising:</p> <p>(a) receiving a quantity to be cryptographically processed, said quantity being representative of at least a portion of a message;</p> <p>(b) generating unpredictable information;</p> <p>(c) using said unpredictable information</p>	

while processing said quantity to conceal a correlation between externally monitorable signals and said secret by randomizing the order of said permutation; and

(d) outputting said cryptographically processed quantity to a recipient thereof.

Ugon '833
Lindholm '725
Van Eck '117
Dunlavy '201

individually or in combination with one or more of the following references:

Sci.crypt Postings
Ugon '833
Lindholm '725
Van Eck '117
Dunlavy '201
Hoppe '894
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)
ISO 7816
FIPS Pub 46-2 (1993)
Menezes (1997)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that

<p>each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.</p> <p>For example, Menezes (1997) at 10 teaches that permutations are commonly used in cryptographic operations.</p>	<p>Each of Van Eck '117, Lindholm '725, and the Sci.crypt Postings fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p>
<p>29. A method of securely performing a cryptographic processing operation in a manner resistant to discovery of a secret within a cryptographic processing device by external monitoring of said device's power consumption, comprising:</p> <p>(a) receiving a variable amount of power, said power consumption varying measurably during said performance of said operation;</p> <p>(b) receiving a quantity to be cryptographically processed, said quantity being representative of at least a portion of a message;</p> <p>(c) introducing noise into said measurement of said power consumption while processing said quantity; and</p> <p>(d) outputting said cryptographically processed quantity to a recipient thereof.</p>	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Griffin '294 Sci.crypt Postings Fruhauf '053 Sprunk '402 Lisimaque '039 Kolbert '057 Lindholm '725 Meyr '962 Nossen '423 Lindholm '713 Saltwick '243 Malek '467 Van Eck '117 Dunlavy '201 Høivik '098</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p>

Ugon '833
Wuidart '917

OBVIOUSNESS

The claim is rendered obvious under 35 U.S.C. §103 by the following references:

Ugon '833
Wuidart '917
Griffin '294
Sci.crypt Postings
Fruhauf '053
Sprunk '402
Lisimaque '039
Kolbert '057
Lindholm '725
Meyr '962
Nossen '423
Lindholm '713
Saltwick '243
Malek '467
Van Eck '117
Dunlavay '201
Høivik '098

individually or in combination with one or more of the following references:

Ugon '833
Wuidart '917
Griffin '294
Sci.crypt Postings
Fruhauf '053
Sprunk '402
Lisimaque '039
Kolbert '057

Lindholm '725
Meyr '962
Nossen '423
Lindholm '713
Saltwick '243
Malek '467
Van Eck '117
Dunlavy '201
Høivik '098
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.

<p>Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the event that Ugon '833 does not fully anticipate the claim, it nevertheless renders the claim invalid as obvious. For example, Ugon '833 teaches all elements of the claim and provides motivation to combine them, e.g., at 3:59-4:8 (the disclosed improvements are designed for use in ST16XY cards); 1:14-19 (the disclosed improvements are intended to be implemented in microprocessors and microcomputers which require protection). In the alternative, Ugon '833, in combination with one or more of the above listed references, renders the claim invalid as obvious.</p> <p>Similarly, each of Griffin '294, the Sci.crypt Postings, Fruhauf '053, Sprunk '402, Lisimaque '039, Kolbert '057, Lindholm '725, M��yr '962, Nossen '423, Lindholm '713, Saltwick '243, Malek '467, Van Eck '117, Dunlavay '201, H��ivik '098, and Wuidart '917 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p>	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (a) and/or (b) by the following references:</p> <p>Griffin '294 Fruhauf '053 Lindholm '725 Lindholm '713 Saltwick '243 Malek '467 H��ivik '098</p> <p>The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833 Wuidart '917</p>
<p>30. The method of claim 29 wherein said step of introducing noise comprises:</p> <p>(a) generating initial noise having a random characteristic;</p> <p>(b) improving the random characteristic of said initial noise; and</p> <p>(c) varying said power consumption based on said improved initial noise.</p>	

OBVIOUSNESS

The claim is rendered obvious under 35 U.S.C. §103 by the following references:

Ugon '833
Wuidart '917
Griffin '294
Fruhauf '053
Lindholm '725
Lindholm '713
Saltwick '243
Malek '467
Høivik '098

individually or in combination with one or more of the following references:

Ugon '833
Wuidart '917
Griffin '294
Fruhauf '053
Lindholm '725
Lindholm '713
Saltwick '243
Malek '467
Høivik '098
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

<p>Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. <u>See Sakraida v. Ag. Pro. Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.</p> <p>Each of Ugon '833, Griffin '294, Fruhauf '053, Lindholm '725, Lindholm '713, Saltwick '243, Malek '467, Høivik '098, and Wuidart '917 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, any of these references renders the claim obvious, alone or in combination with any of the above listed references.</p>	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833 Wuidart '917</p> <p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. §103 by the following references:</p> <p>Ugon '833 Wuidart '917</p>
<p>31. A method of securely performing a cryptographic processing operation in a manner resistant to discovery of a secret within a cryptographic processing device by external monitoring of said device's power consumption, comprising:</p> <p>(a) receiving a variable amount of power, said power consumption varying measurably during said performance of said operation;</p> <p>(b) generating a first clock signal;</p> <p>(c) receiving data to be cryptographically</p>	

<p>processed, said data being representative of at least a portion of a message;</p> <p>(d) generating unpredictable information;</p> <p>(e) generating a second clock signal from said first clock signal using said unpredictable information, such that said second clock signal cannot be reliably predicted from said first clock signal;</p> <p>(f) processing said data using said second clock signal; and</p> <p>(g) outputting said data cryptographically processed quantity to a recipient thereof.</p>	<p>individually or in combination with one or more of the following references:</p> <p>Ugon '833 Wuidart '917 Sprunk '402 Sci.crypt Postings Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997) Schäumüller-Bichl (1987)</p>	<p>Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.</p> <p>SUGGESTION OR MOTIVATION TO COMBINE</p> <p>Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See <u>Sakraida v. Ag Pro, Inc.</u>, 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.</p> <p>Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the event that Ugon '833 does not fully anticipate the claim, it nevertheless renders the claim invalid as obvious. For example,</p>
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<p>Ugon '833 teaches all elements of the claim and provides motivation to combine them, e.g., at 3:59-4:8 (the disclosed improvements are designed for use in ST16XY cards); 1:14-19 (the disclosed improvements are intended to be implemented in microprocessors and microcomputers which require protection). In the alternative, Ugon '833, in combination with one or more of the above listed references, renders the claim invalid as obvious.</p> <p>Similarly, Wuidart '917 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, Wuidart '917 renders the claim obvious, alone or in combination with any of the above listed references.</p>	<p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p> <p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. §103 by the following references:</p> <p>Ugon '833 Wuidart '917</p> <p>individually or in combination with one or more of the following references:</p> <p>Ugon '833 Wuidart '917 Sprunk '402 Sci.Crypt Postings Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997) Schaumüller-Bichl (1987)</p>
<p>32. A method of securely performing a cryptographic processing operation in a manner resistant to discovery of a secret within a cryptographic processing device by external monitoring of said device's power consumption, comprising:</p> <p>(a) receiving a variable amount of power, said power consumption varying measurably during said performance of said operation;</p> <p>(b) receiving an external clock signal;</p> <p>(c) receiving data to be cryptographically processed, said data being representative of at least a portion of a message;</p> <p>(d) generating unpredictable information;</p> <p>(e) generating an internal clock signal from said external clock signal using said unpredictable information, such that said external clock signal cannot be reliably predicted from said internal clock signal;</p> <p>(f) processing said data using said internal</p>	

clock signal; and
(g) outputting said cryptographically processed quantity to a recipient thereof.

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.

Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the event that Ugon '833 does not fully anticipate the claim, it nevertheless renders the claim invalid as obvious. For example, Ugon '833 teaches all elements of the claim and provides motivation to combine them, e.g., at 3:59-4:8 (the disclosed improvements are designed for use in ST16XY cards); 1:14-19 (the disclosed improvements are intended to be implemented in microprocessors and microcomputers which require protection). In the alternative, Ugon '833, in combination with one or more of the above listed references, renders the claim invalid as obvious.

OBVIOUSNESS

The claim is rendered obvious under 35 U.S.C. § 103 by the following references:

Ugon '833
Wuidart '917

33. The method of claim 32 wherein said step of generating said internal clock signal comprises a step of selecting a subset of the cycles of said external clock signal to use as said internal clock signal based on said

unpredictable information.

individually or in combination with one or more of the following references:

Ugon '833
Wuidart '917
Sprunk '402
Sci.crypt Postings
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.

The motivation to use an external signal to generate an internal signal based on unpredictable information may be found, for example, in Sprunk '402 at, e.g., 1:52-54 (random signal to generate clock eliminates the ability to predict the clock even if

<p>observable), and/or Sci.crypt Postings at, e.g. posting by Jim Bell, December 24, 1995 (using pseudorandomly varied oscillator would make resulting computer harder to bug).</p> <p>ANTICIPATION The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:</p> <p>Ugon '833</p>	<p>OBVIOUSNESS The claim is rendered obvious under 35 U.S.C. §103 by the following references:</p> <p>Ugon '833 Wuidart '917</p> <p>individually or in combination with one or more of the following references:</p> <p>Ugon '833 Wuidart '917 Sprunk '402 Sci.crypt Postings Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997) Schaumüller-Bichl (1987)</p> <p>Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.</p> <p>SUGGESTION OR MOTIVATION TO COMBINE Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida</p>
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<p>v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); <u>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</u>, 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.</p> <p>Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, Ugon '833 renders the claim obvious, alone or in combination with any of the above listed references.</p> <p>OBVIOUSNESS</p> <p>The claim is rendered obvious under 35 U.S.C. §103 by the following references:</p> <p>Ugon '833 Wuidart '917</p> <p>35. The method of claim 32 further comprising a step of monitoring for a clock fault in said external clock signal and a step of preventing said processor from outputting said cryptographically processed quantity if said clock fault is detected.</p>	<p>Ugon '833 Wuidart '917 Sprunk '402 Griffin '294 Sci.crypt Postings Hoppe '894 ISO 7816 Wakerly (1989) Rankl (1997) Schaumüller-Bichl (1987)</p> <p>individually or in combination with one or more of the following references:</p> <p>Further, Visa reserves the right to demonstrate invalidity using one or more of the</p>
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references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag. Pro. Inc., 425 U.S. 273, 282 (1976); Anderson's Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.

The motivation to implement a fault monitor as claimed is found, for example, in Griffin '294 at 2:30-36 and generally at 3:37-5:26.

ANTICIPATION

The claim is anticipated under 35 U.S.C. § 102 (e) by the following references:

Ugon '833

OBVIOUSNESS

The claim is rendered obvious under 35 U.S.C. § 103 by the following references:

Ugon '833
Wuidart '917

individually or in combination with one or more of the following references:

Ugon '833

36. The method of claim 32 further comprising a step of introducing noise into said measurement of the power consumption.

Wuidart '917
Sprunk '402
Sci.crypt Postings
Hoppe '894
ISO 7816
Wakerly (1989)
Rankl (1997)
Schaumüller-Bichl (1987)

Further, Visa reserves the right to demonstrate invalidity using one or more of the references listed in Exhibit A-1, and any other art it may later identify.

SUGGESTION OR MOTIVATION TO COMBINE

Initially, no suggestion or motivation to combine one or more of the references listed above is required to render the claim obvious under 35 U.S.C. § 103 as the claim merely sets forth a combination of existing elements with no change in their respective functions nor does the combination provide a new or different function. See Sakraida v. Ag Pro, Inc., 425 U.S. 273, 282 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 60 (1969). Notwithstanding the foregoing, an explicit and/or implicit teaching, suggestion, or inference to combine one or more of the references listed above is provided by: (1) the knowledge generally available to a person of ordinary skill in the art; (2) the prior art references as understood by a person of ordinary skill in the art; (3) the nature of the problem to be solved; (4) the fact that each prior art reference involves similar problems; (5) the knowledge of those skilled in the art that the disclosed methods had been or could be used with cryptographic processing methods; and/or (6) a suggestion in the reference that the disclosed methods had been or could be used with cryptographic processing methods.

Ugon '833 fully anticipates the claim by disclosing each of the claimed elements either explicitly, implicitly, or inherently. In the alternative, Ugon '833 renders the claim obvious, alone or in combination with any of the above listed references.